CLAIMS

WE CLAIM:

1. A method for distributed optical performance monitor in a network, comprising:

selecting a frequency range based on network traffic protocol and transmission rate;

sampling a plurality of points continuously at a frequency;

computing the average power of the plurality of points;

computing a Fast Fourier Transform to obtain a spectrum in frequency domain;

computing a noise spectrum density from the spectrum and the frequency range; and

computing an optical signal noise ratio (OSNR) from the noise spectrum density and the average sampled points.

2. The method of Claim 2, further comprising computing an average optical power from a pre-saved calibration table.

3. A method for distributed optical performance monitor in a network, comprising:

calculating a noise spectrum density from a spectrum and a frequency range; and

computing an optical signal noise ratio (OSNR) from the noise spectrum density and a predetermined calibration data.

4. The method of Claim 3, prior to the calculating step, further comprising computing a Fast Fourier Transform and obtaining a spectrum in frequency domain.

5. The method of Claim 4, prior to the computing of the spectrum frequency domain, further comprising computing an average power of the plurality of points.

6. The method of Claim 5, prior to the computing step of the average power of the plurality of points, further comprising sampling a plurality of points continuously at a frequency.

7. The method of Claim 6, prior to the sampling step, further comprising selecting a frequency range based on network traffic protocol and transmission rate.

8. The method of Claim 3, wherein the computing of the OSNR is based on the following equation:

$$OSNR = \frac{P_{sig}}{P_{ase}} \frac{B_o}{R}$$

where the symbol "P_{sig}" denotes a signal power, the symbol "P_{ase}" denotes an Amplified Spontaneous Emission (ASE) power, the symbol "B_o" denotes a filter band width, and the symbol "R" denotes a wavelength resolution .

9. An optical add/drop multiplexer, comprising:

a first performance monitor cell, comprising:

a coupler for tapping a portion of a first optical signal.

a first photodiode for detecting the portion of the first optical signal; and

a first amplifier coupled to the photodiode for amplifying the portion of the first optical signal.

10. The optical add/drop multiplexer of Claim 9, further comprising: a second performance monitor cell, coupled to the first performance monitor cell, the second performance monitor cell comprising:

a second coupler for tapping a portion of a second optical signal;

a second photodiode for detecting the portion of the second optical signal; and

a second amplifier coupled to the photodiode for amplifying the portion of the second optical signal.

11. The optical add/drop multiplexer of Claim 10, further comprising a third performance monitor cell coupled to the second performance monitor cell, the third performance monitor cell comprising:

a third coupler for tapping a portion of a third optical signal;

a third photodiode for detecting the portion of the third optical signal; and

a third amplifier coupled to the photodiode for amplifying the portion of the third optical signal.

12. The optical add/drop multiplexer of Claim 11, further comprising a fourth performance monitor cell coupled to the third performance monitor cell, the fourth performance monitor cell comprising:

a fourth coupler for tapping a portion of a fourth optical signal;

a fourth photodiode for detecting the portion of the fourth optical signal; and

a fourth amplifier coupled to the photodiode for amplifying the portion of the fourth optical signal.

13. The optical add/drop multiplexer of Claim 12, further comprising a first filter coupled between the first performance monitor cell and the second performance monitor cell.

14. The optical add/drop multiplexer of Claim 13, further comprising a second filter coupled between the first filter and the second performance monitor cell.